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Andersen

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[54] **SIGNAL PROCESSOR HAVING MULTIPLE PARALLELED DATA ACQUISITION CHANNELS AND AN ARBITRATION UNIT FOR EXTRACTING FORMATTED DATA THEREFROM FOR TRANSMISSION**

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[57] **ABSTRACT**

A system for acquiring data from a plurality of analog signal sources includes a multiple-channel asynchronously operating first-stage subsystem each channel of which outputs composite digital representations of the analog signal, which in turn are passed to a digital processor in which the data are used by a second-stage subsystem (**40**). The second-stage subsystem (**40**) has a plurality of signal processing units (**48**), each having an input coupled to a different output channel of the first-stage subsystem. Each of the signal processing units includes a first buffer (**48-2**). The system also includes a plurality of data processing units (**52, 54**). The data processing units have an input coupled to an output of a first buffer of the signal processing units. Each of the data processing units operates under an operating program providing formatting into a data packet having a predetermined format. An arbitration and transmission unit (**44**) has an input coupled to the data processing units and sequentially polls then so as to receive a data packet from a data processing unit having a data packet available. The transmission unit buffers prior to a transmission of the data packet. Each of the signal processing units generates a status signal in response to the associated first buffer reaching a predetermined partially full condition. The transmission unit is responsive to the generation of status signals for interrupting the sequential polling. As a result, a possibility of data overruns and a loss of transducer data is substantially eliminated.

11 Claims, 19 Drawing Sheets